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ROCKS and MINERALS PEEKSKILL, N. Y., U. S. A

The official Journal of the Rocks and Minerals Association

Chips from the Quarry

WHAT EXCUSE FOR BEING HAS A MUSEUM MAN DURING WARTIME?

Karl P. Schmidt, chief curator of zoology at Chicago Natural History Museum, tells, in an article in a recent publication of the institution. Mr. Schmidt writes, in part:

"To the non-scientific public 'pure science' often appears to be of a most impractical nature. The scientific staffs of natural history museums are largely engaged in researches on the distribution of a tiny mouse-like rodent in the Andes, an investigation of the relations of one type of extinct animal with another, or the description of endless 'new species' of plants and animals.

"The urgency of the war effort to preserve a civilization in which pure science may continue, and the necessity of turning every man to a useful niche in that effort, have combined to make museum workers conscious of the impractical nature of their ordinary researches. Many have gone directly into the armed services, or government service in civilian fields, leaving only a few of the older staff members to carry on. Chicago Museum's honor roll now lists 34 men and two women in service out of a total of 206 employees.

"However, whether in the armed forces, in civilian government service, or in the museum itself, the museum staff member has a kind of knowledge that is of vital importance—geography. In the course of museum expeditions many have gained specific knowledge of areas of strategic importance in the daily headlines. Even more important, we discover that our knowledge of details is tied together in a comprehensive acquaintance with whole continents. Both specific and general knowledge have been drawn upon by the army and navy, and by special services. For example, one of Chicago Museum's anthropologists is a member of the National Research Council's Committee on Africa; the Department of Botany has been drawn upon for accounts of the poisonous and edible plants of the tropics; geologists offer a recent acquaintance with the Arctic; and zoologists have supplied expert knowledge of South America and Africa, and, after being consulted abour snakebite in tropics, have been asked to aid in preparing a service-man's 'Baedeker' of the South Sea Islands. Staff members are now in special service directly related to their museum experience in Venezuela, Eucador and Peru. The Army Medical Service draws upon our entomologists for their knowledge of insect-borne disease. Others in combat service have distinguished themselves in ways attributable to their training on museum expeditions."

TWO DEALERS ON SICK LIST

Just as we were going to press, word reached us that two of our advertisers were on the sick list.

John A. Grenzig, the veteran dealer of Brooklyn, N. Y., recently underwent an operation but is doing nicely.

Egbert McElroy, proprietor of Monroe's Mineral Store, Monroe, N. Y., has been seiously sick for over 10 days but is showing signs of improvement.

Readers will join us, we are sure, in hoping for a speedy recovery to health for both of these dealers and in the meantime collectors will understand why their orders may have been slow in filling.

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A WORD ABOUT REDONDO BEACH, CALIFORNIA— AND "BEACH PEBBLES"

By DEWITTE HAGAR

Past President of the Los Angeles Lapidary Society

I have been wanting for some time to correct some wrong impressions concerning Redondo Beach, California, and beach locations in general with regard to finding stones suitable for cutting and polishing and augmenting collections.

About twenty years ago Redondo Beach, which lies about twenty miles southwest of Los Angeles, was a real paradise for folk who liked to hunt for stones on the beach. In those days water-worn pebbles of chalcedony which are known among the rock pickers as "Moonstones" were abundant and almost any day one could find quantities of them, some of them larger than a man's fist. Now of course these are not real Moonstones—because the real Moonstone is a feldspar—but because of their milky appearance, the bluish tint some of them have, and the light that seemed to move over the surface of some of them when turned this way and that, they came to be called Moonstones in common parlance among the devotees of this form of pastime. For purposes of distinction from the real Moonstone I call them "Beach Moons". Now as I say, in those days Redondo was indeed a paradise for the hunters. But suddenly something happened. The stones quit appearing on the beach. Oh, occasionally small quantities of small pebbles would show up but nothing worth while. At the same time stones began appearing on the beach at both Hermosa Beach and Manhattan Beach which immediately adjoin Redondo on the North. That condition continued for about fifteen years or so and then Redondo began the construction of a breakwater, which has now been about half completed. That has apparently changed the currents again because the stones suddenly began to show up at Redondo once more but have never again shown up at either Hermosa or Manhattan. So now the colllectors are again busy at Redondo.

While the stones were, as we say, "running" at Hermosa and Manhattan, my wife and I picked up some remarkable specimens, in fact some of the most beautiful stones in our collection. Also these last two years we have found some beautiful stones at Redondo, altho not as many nor as fine as at the other locations so far. We found beautiful jaspers, moss jaspers, agates, sagenites showing inclusions that look like plumes, fans, feathers, brushes, wheat, deer-hair, etc., and a couple of Beach Moons showing iris or rainbow colors, some with water bubbles—and these water bubble moons are rated very highly among the collectors. We have a set of seven matched stones which came out of one black beach moon that are truly beautiful—they show yellow fortifications in black moon.

But to me the most remarkable are the flower-stones. I have heard opinions expressed by some who claim to know

whereof they speak that the flower-stone is a fossil coral while others claim it is a zeolite, but whatever it is I think it is beautiful and the most unique of all the stones found on the beach. The flowers in some of them really look like flowers—petals, centers, leaves, etc.—some like chrysanthemums, some like daisies, some like old-fashioned garden flowers. I, personally, have found only a few of them but my wife has been very lucky and has picked up many and some of them are the most beautiful I have ever seen anywhere. (Note the picture showing seven stones all cut from the same flower-stone, and there were two other slices besides. Full size of slices about 2½x3 inches. This is one of the best flower-stones I have ever seen.) (This was found at Manhattan Beach, Calif.)

Incidentally, I don't like the term "beach pebbles". It sounds "belittlin". Of course there are lots of pebbles—but again there are many large stones of good quality and rare beauty. As a rule the colored agates make good specimens—either polished all over or with just a "window" polished—but as a rule they are not so good for cabochons because they are mostly brittle and fractured and hard to work up. Most of the jaspers are pitted and with soft spots which "draw out" when being sanded altho we have some very beautiful ones among our cabochons. But the "beach moons" are a delight to work on. They sand out easily and well and they take a wonderful polish and make lovely ring-sets, brooches, hearts, pendants, etc. I have found many kinds of what we call "Woodstone" and in fact have intended making up a collection of this material but never seem to get around to it. That is because I am too busy sawing up new material. These days whenever I get time to do a little work in the shop I start sawing and just keep on sawing, sawing, sawing. Seeing what the inside of the new ones looks like is an irresistible fascination.

If you have never spent a day on the beach picking up stones then you have missed a chance to renew your childhood—because it is more fun than you

Flower Stones found at Manhattan Beach, Calif., by Jane Hagar

have had since you were a kid. If you don't believe this just try it some time. If you try it at Redondo be prepared to get wet because the breakers are really big there and strong and you will be pretty busy trying to get the stones and get out of the way of the rollers. And you may be surprised at what you find too. We have found varieties of petrified wood, bone, a few specimens of sardonyx—but the usual beach stone collector calls a jasper a sardonyx and resents it very much if you try to tell him otherwise. Also they will tell you about the jade they found on the beach and the funny part of it is that a few pieces of jade have actually been found there, tho most of what they call jade is not jade at all. We have met some fine people and made some good friends thru our rock-picking on the beach and we have had real fun out of it in addition to adding some of the most remarkable stones to our collection.

So I would like to make a suggestion to some rock collectors if I may—that is, don't turn up your nose at what you call "beach pebbles"—you may be surprised.

Enlargement of flowers.

IRON DEPOSITS OF KRIVOI ROG, RUSSIA

The most famous iron ore deposits of Russia are those of the Krivoi Rog district in the southern part of the country. This district in normal times produces about 70% of the total iron ore output of Russia. The district and all its mines were captured by the Nazis during the present war but they were recaptured by Russian troops on Tues., Feb. 22nd, 1944.

Location

Krivoi Rog, a city of about 30,000, is in the southern part of the Ukraine province, about 200 miles northeast of the Black Sea port of Odessa. Its geographical location is 47°51′ N. Lat., and 32°20′ E. Long. The city is on the Ingulets River, a tributary of the Dnieper.

Geology

The iron ore of the district is largely a red hematite associated with martite and magnetite. It occurs in stratified deposits whose thickness varies from a few feet up to 350 feet but averages about 70 feet. Quartz is the gangue mineral of the deposits which occur in crystalline schist underlying Tertiary deposits.

Wright[1] says: "The Krivoi Rog iron mines in the Dnepropetrovsk region are situated along the Zheltaya Saksagan and Ingulets Rivers in a narrow zone over a length of about 25 miles in a northwest-southeast direction, the ore occurring in beds several feet thick or forming huge, chimney-like bodies a few thousand feet in length and depth and 30 to 150 feet in width. The ore averages 57% iron, 8% silica, 0.25% manganese, and 0.05% phosphorus."

The deposits were formerly worked opencut but now underground mining methods are used for the most part. In some instances inclined shafts have been sunk from the pit bottoms; in others, vertical shafts have been sunk from the surface. The shafts average about 500 feet in depth though some are almost 1,000 feet deep.

1 Wright, Charles Will, *The Iron and Steel Industries of Europe.* Bureau of Mines, Washington, D. C. (Economic Paper 19), 1939, p. 60.

MICA — FROM BRAZIL KEEPS U. S. WAR MACHINE ROLLING

MICA, A MINERAL with which the average layman is not especially familiar, is the vital cog which keeps the gigantic war machine of the United States rolling.

Recent announcement that a substitute for mica has been found has not diminished the need for the natural mineral, and the United States is contemplating no reduction in its buying of mica from both domestic and foreign sources.

Without mica there would be no generators, magnetos, condensers, and spark plugs for the engines which propel the little jeeps as well as the mighty Flying Fortresses. Without the mineral there would be no electrical installations on tiny torpedo boats or 30,000-ton dreadnaughts to steer them, operate the guns, and furnish light and power for a hundred operations.

Fully 90 percent of all mica mined is used by the electrical industry because of its insulating and dielectric properties. It is unaffected by extremes of high and low temperature, by fire, water, or acid. Its heat conductivity is the lowest of all minerals, and it is highly flexible, transparent, and possesses great cleavage toughness.

This combination of characteristics is found in no other substance. Military requirements, especially for high-quality mica, have not been affected by any substitutes. Although each of several new promising materials being developed possesses some of the characteristics of the mineral, none has the peculiar combination of all the properties which makes mica so valuable.

Development of these new materials has not proceeded past the laboratory stage. While substitutes may eventually fill from 10 to 15 percent of the needs, the remaining requirements will continue to absorb all expected production of the higher-quality mica.

United States Government agencies say no mica miner should feel that his output is no longer vitally needed. These agencies are contemplating no reduction in their buying program either at home or in certain other countries where high-quality mica is being obtained.

Brazil is among the countries in which this buying program is in operation. In recent years mica of good quality has been coming from Brazil in increasing amounts, and to that country the United States is looking for even larger amounts of the mineral to supply the staggering increase in radio, electrical, and mobile equipment which the war demands.

So important is the mineral that it has been granted a priority, on airplanes, next to critically needed personnel. The Axis realized the importance of mica to the extent that, from December, 1940 to June, 1941, mica comprised 90 percent of the cargo carried by "Lati," the Italian airline which formerly operated between South America and Europe. The second-most-important cargo was precious gems, used for grinding and other industrial purposes, but these stones made up only 7 percent of the plane shipments.

The best brains of science long have sought an adequate substitute for mica. When the mineral is used solely for its physical properties there is some hope of switching to another substance. But for its electrical uses, the most important both in war and peace, there is no substitute. To keep engines running, electrical installations working, and radios functioning, mica from the natural state must be used. For its supply of splittings and most of its condenser and spark-plug mica, the United States depends on imports alone.

Spurred by war needs, experts have examined 150 mines in the United States but found only limited quantities of the high type needed.

The distribution of mica throughout the world is a paradox. It is at the same time the most plentiful of minerals and yet the most scarce. Geologists estimate that mica constitutes 4 percent of all the indigenous rocks of the world.

Such a percentage would place its tonnage at astronomical figures, but nature, lavish in distributing the mineral, has been niggardly in creating deposits which are recoverable on a commercial basis. Should a substantial amount of this vast tonnage be recovered by some means as yet not devised, all but a fractional part of it would be suitable for nothing but ground mica of which there already is a plentiful supply. Rare indeed is a deposit with crystals of a size suitable for production of the commercial-sized sheets so vitally needed by industry. The location of such deposits is one of nature's most closely guarded secrets.

Many deposits are small in size and soon worked out. The mineral is found in a pegmatite dike usually less than 200 feet in length, very narrow but of variable depth. Drilling which reveals the size of other mineral deposits is not practical for mica because of its uncertain location in the dike. A diamond drill may miss the deposit entirely. Because of these difficulties, mineralogists have never been able to determine with any degree of accuracy the reserves of mica available as has been done with other minerals and oils.

A good mine seldom contains more than 10 percent mica. Seven percent is suitable only for scrap. Another 2 percent is punch mica, and less than 1 percent is of commercial sheet size. And wastage and spoilage in splitting it and producing block mica reduces the total to a quantity that is "heart breaking" in its smallness.

Chemically, the micas are highly complex silicates of aluminum and one or more bases. This second basic element really determines the characteristics of the usable mica. What the electrical industry needs is potash mica, muscovite or white mica. It is this type which the United States wants in ever-increasing amounts from Brazil. The second principal type is magnesium mica, phlogopite, or amber mica.

Mica is a real "rags to riches" mineral. In 1803, the United States sank the first mica mine in the State of New Hampshire. The physical uses were for stove windows, lantern chimneys, and other work requiring a substance that was heat resistant and transparent. The new mineral, because it looked much like isinglass, was erroneously given that name by laymen, and the misnomer persists to the present day. Real isinglass is prepared from the air bladders of fish, especially sturgeons, and is used as an adhesive, for clarifying liquors, and for stiffening silks and linens. It has few properties in common with mica.

The discovery in 1892 of a method to make built-up mica gave the mineral its first important use. Thin films of it were placed together and held firm by shellac, but now a more permanent cement is also used. Such built-up sheets can be made into any size and then cut down for specific uses. Through built-up mica it was made possible to adopt standard designs for generators and motors.

The evolution of the electrical industry and of the internal combustion engine raised mica to the status of a big-time mineral, although the general public has never realized its importance. For a long time, telephone headsets and phonographs used mica. Then came the radio and the airplane to make new demands upon it. While high-grade mica kept the motors of automobiles and planes running, ground mica was placed in the tires to keep the tubes from being "pinched" by heat and friction.

Fully 90 percent of the best mica mined goes to the electrical industry. It is used both as straight insulation, such as separators for commutator bars, disks, washers, and bushings, and as a form on which to wind heating elements of iron for both industrial and domestic heating equipment. Even more important is its use for condensers where the best results can be obtained only from high-grade mica which has no flaws. An equally high grade also is used in radio tubes. Each tube requires two to four pieces of mica to hold the filaments upright and to keep the internal assembly rigidly in the center of the tube. Mica is the

(Continued on page 114)

TRANSMIGRATION OF THE ELEMENTS

By EUGENE W. BLANK
Jersey City, N. J.

Approximately 33 of the known elements may be considered common in the practical sense that they exist in large quantities and are well distributed throughout the world (1). Since they are in everyday use their characteristics and properties are in general better known than those of the remaining elements. It is, therefore, usual to refer to the latter elements as the "rare" or "rarer" elements. This of course is a purely arbitrary distinction. It is manifestly impossible to draw a sharp line of division between the common and the rare elements either on the basis of relative importance, price or scarcity. Thus the rarer elements are essential to modern industry to fill specific needs for which no other elements will suffice. Nor is price a true criterion. Many of the rarer elements could compete on an economic basis with the so-called common elements if there were a sufficient demand to warrant large tonnage outputs. The term rare does not imply intrinsic value, rather that the rare elements are produced in such relatively small quantities as to be chemical curiosities seldom seen outside chemical laboratories.

An examination of Clarke's table (2) for the composition of the lithosphere reveals that titanium dioxide, which is usually regarded as a rare element (3), is 65 times as abundant as copper, zinc or lead. Similarly vanadium trioxide is 1.4 times as abundant as the latter three elements. Yet titanium and vanadium are both regarded as rarer elements in contra-distinction to copper, zinc or lead which are popularly regarded as common metals. As a final illustration, zirconium dioxide is 1.5 times as plentiful as nickel oxide.

Though the rarer elements have in many cases an aggregate tonnage that exceeds that of many elements looked upon as common they differ in one striking particular. The rarer elements in many cases are so widely and uniformly distributed as to defy economical recovery. They are in a sense paradoxical elements being present everywhere but nowhere in particular! This is true of titanium which is seldom found concentrated but is universally distributed in rocks and ores, quite frequently to the detriment of the latter.

Since the beginning of time the earth has been undergoing change. The oceans are the great reservoirs to which the elements tend to gravitate as the result of erosion. It is axiomatic that elements can be neither created nor destroyed but they are continually undergoing redistribution. This process of redistribution has always been in operation but has now been accelerated by modern mining operations. Ore bodies, so immense they would require ages for removal by the natural operation of erosion, are now in the process of being rapidly stripped by man. As a result many of the common elements are becoming scarce or in other words are becoming rare elements. We may speak of the operation as the transmigration of elements; a widespread diffusing of common elements until the original sources have been worked out with the concomitant impossibility of reclamation of the utilized elements due to their widespread scattering.

Ancient copper mines in England and zinc mines in Laurium, Greece, are very extensive. The remains of their workings show that large amounts of copper and zinc were used in ancient times yet with the exception of a few artifacts in museums the metals for the most part are irrecoverable.

Since those days to the present man has constantly disseminated the natural stocks of the elements. The elements in everyday use are constantly being scattered in small quantities that will not pay for recovery. When one considers that most of the inroads on these natural

resources has occurred during the past century the rate of redistribution becomes significant. It is of interest to consider several specific examples.

City dumps aggregating hundreds of square miles surround the modern city. Chemical analysis of these dumps reveals the presence of most of the elements. Included are gold from plated articles, platinum and molybdenum from electrical apparatus and iridium from fountain pen tips. Yet none of these elements, and others not named, are economically recoverable at the present time.

The world production of tin amounted to about 180,000 long tons in 1939. Of this amount the United States imported about 70,100 long tons. Reclamation of tin amounted to 4,300 long tons as metal, and 16,700 long tons in alloys and chemicals (4).

Tin is a vitally strategic element. It is present in enormous quantities in the dumps but the amount of material that would have to be handled during the process of beneficiation prohibits low cost recovery.

Sixty-four hundred tons of lead per year alone are used in producing lead tetraethyl for use in the production of antiknock gasoline (5). This amount of lead, in the form of the bromide, is annually laid down along the highways.

Taking 64,000 tons of lead as the total for a ten year period and the area of the United States as 3,000,000 square miles a simple calculation shows that 43 pounds of lead have been dispersed in the form of a fine dust of lead bromide over each square mile. Considering that vast areas in the west have little automobile traffic the average for thickly populated areas is considerably higher. Possibly this helps to explain why extreme precautions must be taken when determining lead in the laboratory with dithizone, a reagent sensitive to $4x10^{-5}$ milligrams of lead in a concentration of 1 : 1,250,000 (6). Experience with the dithizone reagent reveals that it is extremely difficult to prepare a reagent blank that shows less than 1 to 2 parts per million of lead.

Really enormous quantities of lead are used in the production of paint and agricultural sprays, a form not amendable to recovery. The world production of lead in 1930 was 1,664,465 metric tons.

The classic example of the dissipation of an element is that of carbon in the form of petroleum. The petroleum industry is now faced with a declining output and an increased dependance upon foreign sources. This has been the subject of numerous editorials and articles in both the lay press and scientific publications (7) (8) (9).

The high grade Minnesota iron ores which at one time were considered inexhaustible are disappearing at a rate which promises their depletion at an early date. The non-ferrous metals, particularly copper, are becoming more difficult to obtain as the mines become deeper and the leaner ores are brought into production. Little mercury ore remains in the United States.

Coal stocks appear to be enormous but will tend to shrink at an accelerated rate as more and more coal is hydrogenated in the future to replace oil.

Consideration of the few examples given here indicates that the transmigration of elements is a phenomenon that will vitally affect civilization in the centuries to come. Metals are essential to the modern living we experience today. Possibly in the future chemurgy will give us sufficient plastics to supplant many of the metals. Some success has already been attained in isolating bromine and magnesium from sea water. It is, however, an undeniable fact that the metals in common use are in the process of becoming rare metals, not by diminution of their aggregate bulk but by being scattered without serious efforts toward reclamation. It is true that the rate at present is, perhaps, insignificant, but it is far more likely to increase than decrease in the future.

Will the earth become ultimately a picked out shell, bankrupt of mineral resources? There will have been no loss of elements, but they will have become "rarer" elements, one and sundry.

(Continued on page 112)

NEW BRITAIN ISLAND

An island which is receiving much publicity in the newspapers and over the radio is New Britain, in the southwest Pacific. It is the largest and most important island of the Bismarck Archipelago, a group of more than 100 islands lying south of the equator and east of New Guinea. The group was formerly known as the New Britain Archipelago but in 1884 Germany established a protectorate over them from whence it received its present name, Bismarck Archipelago. The chief islands of the group are New Britain, New Ireland, New Hanover (Lavongai), Duke of York, and Admiralty. The total area of the archipelago is about 18,000 sq. miles.

New Britain lies 50 miles east of New Guinea in the Pacific Ocean, between 5° and 6° S. Lat., and 150° E. Long. stretches east and northward in a long, narrow crescent. It is 300 miles long but its width varies from 5 to 90 miles —averaging about 30 miles. Its area is about 10,000 sq. miles.

St. George's Channel (25 miles wide) separates it from New Ireland Island to the east, and Dampier's Strait (50 miles wide) separates it from New Guinea to the west.

New Britain Island was discovered in 1699 by William Dampier, an English navigator. When Germany established a protectorate over the island its name was changed to New Pomerania. In 1914, during the first World War, Australian forces occupied the archipelago and up to its seizure by the Japs (in 1942) it was governed by Australia under a mandate. Until September, 1941, Rabaul was the capital of the Mandated Territory, which also included northeastern New Guinea. Rabaul is situated on the northeast end of New Britain on beautiful Blanche Bay.

The climate of New Britain is hot and moist. The natives are Melanesians, are considered treacherous, and many are said to be cannibals. The population is estimated at 85,000. The chief crop of the island is cocoanuts.

On Wed., Dec. 15, 1943, troops of the U. S. 6th army, commanded by Lt. Gen. Walter Krueger, made its first landing on New Britain Island. The landing was made in the southwestern part of the island, at Arawe on Cape Merkus Peninsula. Since then the troops have extended their holdings and advanced considerably eastward towards the strong Jap base of Gasmata on the southern shore of the island. Landing have also been made in the Cape Gloucester area at the extreme western tip of the island and elsewhere.

Geology

New Britain is extremely mountainous—a high and very rugged range runs from one end to the other. So rugged are the mountains, that though the mean width of the island is only 30 miles, New Britain has not been crossed by a white man except at its northern extremity.

The highest peaks in the island are all in the north. The Father (7,500 ft. high), on the northwest coast is the highest of all; it is an active volcano. Near it are two other high peaks, the North Son and the South Son. Near Rabaul are three other high peaks, the Mother, The North Daughter, and the South Daughter.

Volcanic activity is evident throughout the island. In May, 1937, a volcano on a small island in Blanche Bay (in Rabaul's harbor) blew up suddenly causing much havoc and loss of life. Rabaul and the area for miles around was covered many feet deep with gray pumice that had been belched forth from the volcano. So destructive was this eruption, and the earthquake which followed —they had been quite frequent before— that the seat of government in September, 1941, was transferred from Rabaul to Lae on the mainland of New Guinea. But the inhabitants of Rabaul remained behind, rebuilding a new town. During the present war the town has been so heavily bombarded by the Allied air force that it is doubtful if even one house now remains standing.

The following rocks from New Britain

have been reported and described by Liversidge[1]:

Lava: from the volcano in Blanche Bay, with a dark grey base, almost black, containing crystals of glassy feldspars. Some of the specimens are of low specific gravity, and very scoracious. Certain of the cavities contain a white powdery mineral partly soluble with effervescence in hydrochloric acid.

Some of the small specimens of lava are vermiform or worm-like in shape, others are in the form of lapilli, etc.

Limestone: white, granular.

Obsidian, or volcanic glass: from the volcano in Blanche Bay. Some of it is black in color, but greyish in parts; more or less parallel greyish bands also occur in it. Some specimen of a pitchy black color contains a few scattered feldspar crystals, and another is, in addition, characterized by the presence of vesicular cavities.

Pumice: most of the specimens are black. One specimen is of a pale brown color, and is rather more vesicular than the black pumice.

Volcanic Conglomerate: composed for the most part of rounded fragments of a dark-colored igneous rock, probably basalt, with lighter-colored and greenish pebbles cemented together by black and dark green pastes. The pebbles are so loosely bound together that they can be separated by the fingers, the paste being comparatively soft, and mixed with delessite (?) in parts.

1 Liversidge, A., *The Minerals of New South Wales, etc.* London, 1888, pp. 255-256.

Mineralogy

Since New Britain is a volcanic island, many minerals must occur on it but unfortunately little is known about them. The only ones which seem to be recorded, were those collected in 1875 by the Rev. George Brown, Wesleyan Missionary. These were examined and described by Liversidge. Rev. Brown also collected in the same year the rocks which have already been described. We hope that some member of the Rocks and Minerals Association, in the allied force on the island, may run across more and better minerals so that the list may be greatly increased.

The following minerals have been reported and described by Liversidge[2]:

Aragonite: in the form of nodular masses, seen on fracture to be built up of beautiful transparent columnar crystals arranged in a radiate manner. They look as if they had been set free from amygdaloidal cavities in igneous rocks.

Gypsum: found with sulphur in the crater of the volcano in Blanche Bay in the form of acicular crystals.

Quartz: of a chalcedonic character.

Sulphur: from the crater of the volcano in Blanche Bay, in the form of small pieces, evidently broken off an incrustation, of about ½ inch to ¾ inch in thickness, very clean and of a bright sulphur-yellow color. The cavities in it are lined with small crystals but for the most part it is somewhat friable.

2 Liversidge, idem. p. 256.

HUGE SALT DEPOSIT IN THE DOMINICAN REPUBLIC

In southwestern Dominican Republic, near the city of Cabral (Duverge community, Barahona province), are the well-known Salt Hills of the island. The hills form a chain of about 18 kilometers (11 miles) in length of which 14 kilometers (8½ miles) is solid salt stratified in almost vertical lenses.[1]

Dominican Republic occupies the eastern "half" of the Island of Haiti in the Caribbean Sea (West Indies).

The deposit is mined by the Salinera Nacional C por A, which supplies the island with salt. Salt is also an important export.

The deposit is worked open cut—one large quarry has vertical walls almost 100 feet high and at least the same in width and is several hundred feet long. The salt is often so pure and clear (like ice) that fun-loving Dominicans at times give small cubes to visiting Americans to cool their drinks.

1 *Rocas y Minerales de la Republica Dominicana*, by Dr. Willy Lengweiler, Ciudad Trujillo, Dominican Republic, 1939, p. 64.

THE CHAMELEON OF GEMS

By NICOLA GOODWIN D'ASCENZO

Quite a few years ago I purchased a Russian Alexandrite, only recently having had it mounted in a ring. I expected of course that it would perform as always in the routine manner but no, as soon as it was mounted it began to play tricks.

All of the books have had us believe that the Alexandrite is green in daylight and columbine-red under artificial light. Well, it is, but only sometimes. For instance, in the sunlight (which is of course daylight) it is a gorgeous raspberry-red, infiltrated with only a tinge of green. I then turn my back to the sun and examine it again. It is now a beautiful deep tourmaline-green throughout.

Eight P. M. and all's well, except the Alexandrite. I am writing by artificial light and I glance at the stone. Horrors, it is green! Recovering from the shock, I walk into the kitchen for a drink of water. Fearfully, I again look, and lo, it is the color of a Siberian Amethyst!

The secret of this second misbehaviour lies in the fact that my writing room is lit by a fluorescent lighting fixture. But wait, the wall brackets contain ordinary incandescent bulbs and I turn them on too. The stone is now partly green, partly red. . Indeed, it is at the very peak of its magnificence, the distance from the two sources of light regulating the predominance of either red or green.

The Alexandrite has therefore earned the title of "The Unpredictable", going hand-in-hand with its source. I am moreover always on the alert for new surprises, hoping that perhaps someday, perhaps indeed on that greatest of all days to come, that I shall see by the rocket's red glare, the victorious Red, White, and Blue.

Transmigration of the Elements

(Continued from page 109)

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(4) Sneed and Maynard, "General Inorganic Chemistry", p. 964, D. Van Nostrand Co., Inc., New York (1942).

(5) Ibid., p. 978.

(6) Mellan, "Organic Reagents in Inorganic Analysis", p 426, The Blakiston Co., Philadelphia (1941).

(7) Editorial, Ind. Eng. Chem. *35*, 926 (1943).

(8) B. T. Brooks, "Petroleum Shortage in the United States", Chem. Eng News *21*, 69 (1943)

(9) B. T. Brooks, "A New Phase of the Petroleum Industry", Chem. Eng. News *21*, 939 (1943).

A Young Collector is Grateful!

Editor R&M:

Some time ago I was in the neighborhood library and finding nothing good in the fiction section, went over to the technical. There my eyes fell upon a book on mineralogy by George L. English. Ever since I picked up that book, mineralogy has been my hobby. My interest lagged after awhile chiefly because no one I knew had it as his hobby, but my interest rose when I became a member of the Rocks and Minerals Association and received ROCKS AND MINERALS. Through the magazine I have learned of the Mineralogical Club of Hartford. Though I am too young to join (I'm only 13), I have met many older collectors who are helping me along the way. Still I had no one my age to trade with. Finally my chance has come for in this month's (March) issue of ROCKS AND MINERALS appears the notice that a Junior Mineral Exchange has been formed in Revere, Mass.

I am grateful to ROCKS AND MINERALS for helping me along. I hope you may have a chance to help many other boys and girls in the way that you have helped me.

Bill Lowry
218 Grandview Terr.,
March 10, 1944. Hartford 6, Conn.

Club and Society Notes

New York Mineralogical Club

American Museum of Natural History, New York, N. Y., Wednesday, January 19, 1944.

Convened: 8:05 P.M. Attendance: 52.

The meeting was called to order at 8:05 P.M. by the President, Mr. Taylor. Mr. Stanton proposed for membership Mr. H. S. Williams and Mr. D. J. Atkins who had formerly been members of the club. It was moved and passed that they be elected.

Mr. Taylor announced the death of Mr. George L. English on January 2nd at Winter Park, Florida. Mr. Atkins told of Mr. English's interest in rare earth minerals, of his insight into the increasing importance of industrial minerals and of his part in the founding of many of the important collections of his day.

It was moved and passed that a memorial to Mr. English be placed on record in the minutes of the club and that a copy be sent to Mrs. English.

Mr. Trainer presented to the Club the book "Minerals" by Elizabeth K. Cooper and Herbert S. Zim, a member of the Club. He also brought minerals from his collection for the members of the Club.

Dr. Clifford Frondel addressed the meeting on the subject of "Mineralogical and Industrial Aspects of Twinning". He emphasized the importance of statistical studies to prove the validity of any given twin law and showed a photograph of 14 Japanese twins of quartz. After illustrating various twin laws with lantern slides of feldspar, quartz, and other common minerals. Dr. Frondel discussed the part that twinning in quartz plays in the manufacture of quartz oscillator plates for radio transmission.

The meeting was adjourned at 9:55 p.m.

Elizabeth Armstrong, Secretary.

Meeting of February 16, 1944.

Convened: 8:10 P.M. Attendance: 49.

The meeting was called to order at 8:10 p.m. by the president, Mr. Taylor. Mr. William R. Eberle and Miss Dorothy Stevens were elected to membership. Nominations from the floor for the nominating committee for the following year were as follows:

Mr. E. L. Sampter
Mr. E. A. Maynard
Mr. J. C. Boyle
Mr G. E. Ashby
Miss Gwynne Richards

It was moved and passed that the secretary be directed to cast a ballot electing the five nominees to the nominating committee.

Mr. Ernest Weidhaas, long a member of the club, spoke on "Freak Simulations in Minerals". He gave a historical sketch of the early uses of such simulations as amulets and talismans and told of his own experiences in accumulating his extensive collection. Specimens from this collection displayed by Mr. Weidhaas included simulations of fruit and animals and an excellent head of Voltaire.

The meeting was adjourned at 9:00 p.m.

Elizabeth Armstrong, Secretary.

Mineral Science Club of Little Rock

On Tues., Jan. 25th, 1944, a group of 17 collectors in Little Rock, Ark., after a brief meeting, formed the Mineral Science Club of Little Rock.

A week later, at a get-to-gether dinner meeting, rules and by-laws were adopted, and committees appointed. Officers are: L. B. Pringle, President; Carl T. Linderholm, Vice-President; John R. Totter, Sec.-Treasurer.

A week after that, Tues., Feb. 7th, the first program meeting was held. Jack Roehm, field geologist for the Arkansas Geological Survey, gave a talk on the general geology of Arkansas, followed by one on the minerals of Arkansas.

At future meetings, different mineralized districts of Arkansas will be discussed, one-half the time will be given to the detailed geology of the district, followed by minerals of the district and mode of occurrence.

Meetings are to be held on the second Tuesday of the month.

Mineralogy, a Good Subject for Children!

Editor R&M:

I started in mineralogy primarily to give my two daughters a useful and interesting hobby. We now have a nice little collection, add to it from time to time, and enjoy ROCKS AND MINERALS very much. It may interest you to know that my older daughter, whenever she has a treatise to prepare in high school, chooses a mineral subject, amplifying it by using actual specimens. She has received extra praise and good grades because of the oddity of the general subject. In school, after seeing "Madam Curie", she was the only one who knew anything about pitchblende, its properties, or its appearance. I feel that mineralogists as a whole could offer their children nothing better than to show them more of the wonders of this old earth and give them a finer appreciation of life through this medium.

JAMES W. DURST,
Gastonia, N. C.

Feb. 29, 1944.

With Our Dealers

James W. Riley, of Springfield, Ohio, who has been running a classified ad for a number of months, has contracted for larger space for the balance of 1944. Evidently his fine gemmy Ohio jasper appeals greatly to collectors!

Want any fluorescent minerals? A. J. Alessi, of Lombard, Ill., has a nice stock of them. See his ad in this issue!

Are you in the market for a good lapidary machine? The B. & I. Manufacturing Co., of Burlington, Wisc., have a good one. Write today for their literature and information!

That very fine opal which was offered collectors last month by the Desert Rat's Nest, of E. Pasadena, Calif., has been sold. (It pays to advertise in ROCKS AND MINERALS). This month, Star garnets, Montana sapphires, and beautiful chrysocolla are offered. Order some of them before they are sold out!

Attention serious collectors! Read what the Western Mineral Service, of Helena, Mont., are featuring this month. It should appeal especially to you!

A new advertiser this month is the Walter Maguire Co., Inc., of New York City. They are not offering minerals nor any items of interest to collectors. They have a product —made from Peekskill, N. Y., emery—which makes the hardest, toughest industrial floor known! Factories, warehouses, garages and other establishments all over the country are using Cortland Emery Aggregate for their floors. Your plant should do likewise.

Vanadinite is one of the most spectacularly beautiful minerals known! Warner & Grieger, of Pasadena, Calif., have such a large stock of this beautiful mineral that they can offer specimens to fit any pocketbook—from 25c up to $15.00 per specimen. Measure your pocketbook today and get a vanadinite to fit it!

Micro-mount collectors attention! John A. Grenzig, of Brooklyn, N. Y., has just received a new stock of micro-mount boxes. How many dozen are you going to order?

Ward's Natural Science Est., Inc., of Rochester, N. Y., have reserved another fine selection of choice minerals for our readers. First come, first served—so rush your order to them if you want to obtain even one of the fine specimens offered this month!

Amethyst is the birthstone for February! That may have been the reason why Lee Filer, of Central Valley, N. Y., featured this mineral in the February issue of ROCKS AND MINERALS. And it was a wise move as his large supply was cleaned out. But he has received another good supply so those who failed to order a nice amethyst during February have the opportunity to purchase it now.

Smith's Agate Shop, of Portland, Ore., announce new reduced prices for their diamond saws. Buy a half dozen of them—for yourself and friends—and start sawing. It's lots of fun sawing minerals and polishing them and it increases their beauty and value, too.

Rainbow Pyrites! Did you ever hear of such pyrites? These are beautiful specimens from the iron district of southern Colorado. A nice stock of these attractive specimens are offered collectors by the West Coast Mineral Co., of La Habra, Calif.

Want a 25 pound topaz crystal for your collection? Schortmann's Minerals, of Easthampton, Mass., have such a specimen for sale—also many colorful minerals! How many do you want?

J. L. Davis, of Hot Springs, Ark., sold so many fine quart crystals during February, from his ad in that issue, that in his rush to fill orders he forgot all about the March issue until it was too late. His new ad appeared in time to catch this issue.

MICA—FROM BRAZIL

(Continued from page 107)

insulating material in transformers and the dielectric in condensers.

Oil may be the lifeblood of the war machine, but the heart of it is mica. Nature, which has aided men by generously placing oil in well-defined and usually accessible pools, has sternly refused to cooperate in its distribution of mica. And even more sternly, it has refused to help in the matter of producting substitutes. Only real mica can keep the war machine running.

THE AMATEUR LAPIDARY

CUTTING GEMS BY HAND

By C. C. CURTIS AND J. H. HOWARD

PART 3

Smooth Grinding the Top

Use same pan and same kind of mud as was used for smooth grinding the base. The pressure should be light, especially toward the end of this job. If heavy pressure is used at that time it will certainly develop flats that are almost impossible to remove in later operations. Practice to acquire a rythmic twisting and turning of the stone during each stroke to avoid flats. Be sure to continue this grind long enough to remove deep pits and scratches left by the rough grinding.

Coarse Sanding Front

Use same kind of cloth, No. 280, as was used for similar operation on base. Use on leather as instructed in that paragraph.

Alternate method: on stones that are of uniform hardness, an equally good or better scheme is to rub the stones on a hardwood block with a paste of No. FF carborundum and water, the same mud that has been specified for an alternate method under the "coarse sanding" treatment of the base. Several grooves of varying size and shape may be cut in the block and the mud used in these grooves. This works faster and better than rubbing on a flat block. If this scheme is used the stone may be taken directly from this step to the final polish, but if the No. 280 cloth is used the stone must be given a smooth sanding.

Smooth Sanding

The same kind of cloth, on the wet leather pad, as was used in smooth sanding the base. This operation must remove all scratches.

Polishing Front

The same leather and tin oxide is used as for polishing the base. It pays however to use a separate piece of leather and install on a block that has a groove cut under the leather. This permits the leather to be pushed down into the groove and take somewhat the curve of the stone.

Alternate method: on some stones the tin oxide paste on a piece of optician's felt seems to do the work faster and easier. And sometimes when neither of these schemes works perfectly, the tin oxide sprinkled on felt and used dry will turn the trick.

General Notes

A surface, no matter how rough, will appear smooth when wet. The stone must always be wiped dry for inspection.

The naked eye is not critical enough for inspecting work in progress. After a stone is finished, or nearly finished, the natural eye can see the surface very well by reflected light. But before the polish begins, while the stone is rough, a hand lens or a jeweler's eye loupe must be used. This can be anything from a 5 power to a 10 power lens, preferably the latter.

Sometimes, while the stone is in the intermediate stages, it is hard to see just what condition the surface is in. A brief rubbing on the coarse carborundum cloth will give enough polish to the high spots that the general condition of the surface may be seen.

It is extremely important that abrasives of any given grade not be allowed to get mixed with and contaminate the finer grades. A single grain of No. 100 carborundum mixed with the No. FF mud can spoil and make it impossible to smooth a gem until the grain is removed.

The hand cutting method outlined here is suitable for any material of the hardness of agate or less hardness. With minor modifications it might work the harder stones but would certainly be very slow on a material such as sapphire.

As for speed of the operations, there is no use trying to estimate it. It depends on too many factors. As typical: one might today saw a square inch of a material such as feldspar in 20 minutes. Tomorrow it might require an hour and the worker might never learn what made the difference. Ordinarily, a square inch of agate should be sawed in about an hour. After the slab is sawed and the corners trimmed off, a gem ¾" long by ¼" wide by ¼" deep should be completed in about two hours.

After material is sawed into slabs, much time can be saved by "trimming" the corners instead of grinding them off. This can be done with a cold chisel and hammer with a piece of iron or steel as an "anvil", or, use a pair of cheap side-cutting pliers. Pinch off small successive bites. Experiment with material of no value.

To repeat a caution. All pans and blocks must be fastened to the table or workbench. Heavy pressure is used in most of the operations and if the pans and blocks are not fastened they will skid. The speed of cutting is very dependent on pressure.

Summary of Needed Equipment and Supplies

The following list covers only the items referred to in the foregoing instructions, including some alternates but not all. The list is subject to much variation to suit the particular desires and ideas of the individual. Quantities may be increased or decreased by any amount:

2—metal pans 4"x8"x¼".
7—wood blocks ¾"x4"x12".
2—hardwood blocks, same size.
1 lb.—No. 100 Carborundum grains.
1 lb.—No. FF ditto.
1 lb.—Commercially pure tin oxide.
4 pcs.—4"x8" optician's felt.
1 lb.—Chasers cement.
1—alcohol lamp.
1 pr.—gas pliers for holding stones while warming.
1—magnifying glass, 5 power to 10 power.
1—coping saw frame.
6—mild steel blades, ½"x8"x24 ga. to 28 ga.
2—C-clamps.
Sufficient lap sticks. Make as needed.

Note. Where the term "Carborundum Cloth" has been used in this paper, it should be borne in mind that either cloth or paper may be used but that the "wet or dry" kind must be used. Some carborundum cloths cannot be used wet.

BIBLIOGRAPHICAL NOTES

Krustallos: A story of quartz.

Its romance in the past; its realities in the present; its promise for the future—this in a nutshell is the text matter of this very interesting treatise on quartz.

This attractive brochure of 40 large pages is a remarkable publication not only for its very interesting story of quartz but especially for the many fine illustrations (53 of them)—in fact it is a pictorial story of quartz. The treatise was initiated, planned, and assembled by Herbert T. Strong, noted authority and lecturer on the subject of "color", of 30 Rockefeller Plaza, New York City. For aid and advice in compiling the materials in the brochure, credit is due the following:

Dr. Walter G. Cady, Science Director, Wesleyan University, Middletown, Conn.

Dr. Paul F. Kerr, Professor of Mineralogy, Columbia University, New York City

Joseph D'Agostino, Radio Engineer, National Broadcasting Co., Radio City, New York City

Dr. Fred H. Pough, Curator of Geology & Mineralogy, American Museum of Natural History, New York City

John J. O'Neill, Science Editor Herald-Tribune, New York City

August E. Miller, President of the Miller Laboratories, 9226 Hudson Blvd., No. Bergen, N. J., is the publisher of the brochure. All photographs shown depicting the processing of the oscillating quartz crystals were taken in the Miller Laboratories.

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